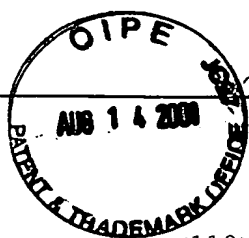


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SEQUENCE LISTING

<110> Gonsalves, Dennis  
Pang, Sheng-Zhi

<120> TOSPOVIRUS RESISTANCE IN PLANTS

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<213> Tomato spotted wilt virus

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<211> 2216

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<213> Tomato spotted wilt virus

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ctctggctaa gggttccaaa ggttttgaag caggtttcca ttcagaaatt gttcaagggt 180  
gcaggagatg aaacaaacaa aacattttat ttatctattg cctgcattcc aaaccataac 240  
agtgttgaga cagctttaaa cattactgtt atttgcaagc atcagctccc aattcgcaaa 300  
tgcaaagctc cttttgaatt atcaatgatg ttttctgatt taaaggagcc ttacaacatt 360  
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caaactatgt ctтacttaga cagcatccaa atcccttcат ggaagataga ctttgccaga 660  
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<211> 1709

<212> DNA

<213> Tomato spotted wilt virus

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<210> 7

<211> 260

<212> PRT

<213> Tomato spotted wilt virus

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Thr Asp Ser His Phe Lys Leu Ser Leu Trp Leu Arg Val Pro Lys Val  
 35 40 45

Leu Lys Gln Val Ser Ile Gln Lys Leu Phe Lys Val Ala Gly Asp Glu  
 50 55 60

Thr Asn Lys Thr Phe Tyr Leu Ser Ile Ala Cys Ile Pro Asn His Asn  
 65 70 75 80

Ser Val Glu Thr Ala Leu Asn Ile Thr Val Ile Cys Lys His Gln Leu  
 85 90 95

Pro Ile Arg Lys Cys Lys Ala Pro Phe Glu Leu Ser Met Met Phe Ser  
 100 105 110

Asp Leu Lys Glu Pro Tyr Asn Ile Val His Asp Pro Ser Tyr Pro Lys  
 115 120 125

Gly Ser Val Pro Met Leu Trp Leu Glu Thr His Thr Ser Leu His Lys  
 130 135 140

Phe Phe Ala Thr Asn Leu Gln Glu Asp Val Ile Ile Tyr Thr Leu Asn  
 145 150 155 160

Asn Leu Glu Leu Thr Pro Gly Lys Leu Asp Leu Gly Glu Arg Thr Leu  
 165 170 175

Asn Tyr Ser Glu Asp Ala Tyr Lys Arg Lys Tyr Phe Leu Ser Lys Thr

180                                      185                                      190  
 Leu Glu Cys Leu Pro Ser Asn Thr Gln Thr Met Ser Tyr Leu Asp Ser  
           195                                      200                                      205  
 Ile Gln Ile Pro Ser Trp Lys Ile Asp Phe Ala Arg Gly Glu Ile Lys  
           210                                      215                                      220  
 Ile Ser Pro Gln Ser Ile Ser Val Ala Lys Ser Leu Leu Lys Leu Asp  
 225                                      230                                      235                                      240  
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 <211> 858  
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 <213> Tomato spotted wilt virus

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 ttgactcaaa ggggtggaag caatcttaga tttgatagta ttgagattct cagaattccc 540  
 agtttctctca acaagcctga cctgatcaa gctatcaagc cttctgaagg tcatgtcagt 600  
 ggctccaatc ctgtctgaag ttttctttat ggtaatttta ccaaaagtaa aatcgctttg 660  
 ctttaataacc ttcattatgc tctgacgatt cttcaggaat gtcagacatg aaataatgct 720  
 catctttttg atctggtcaa ggttttccag acaaaaagtc ttgaagttga atgctaccag 780  
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<210> 9  
 <211> 2028  
 <212> DNA  
 <213> Tomato spotted wilt virus

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<210> 10

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<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence: primer

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<210> 11

<211> 18  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: primer

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18

<210> 12  
 <211> 467  
 <212> PRT  
 <213> Tomato spotted wilt virus

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Trp Gly Ser Thr Ala Ser Gly Lys Ser Ile Val Asp Ser Tyr Trp Ile  
 20 25 30

Tyr Glu Phe Pro Thr Gly Ser Pro Leu Val Gln Thr Gln Leu Tyr Ser  
 35 40 45

Asp Ser Arg Ser Lys Ser Ser Phe Gly Tyr Thr Ser Lys Ile Gly Asp  
 50 55 60

Ile Pro Ala Val Glu Glu Glu Ile Leu Ser Gln Asn Val His Ile Pro  
 65 70 75 80

Val Phe Asp Asp Ile Asp Phe Ser Ile Asn Ile Asn Asp Ser Phe Leu  
 85 90 95

Ala Ile Ser Val Cys Ser Asn Thr Val Asn Thr Asn Gly Val Lys His  
 100 105 110

Gln Gly His Leu Lys Val Leu Ser Leu Ala Gln Leu His Pro Phe Glu  
 115 120 125

Pro Val Met Ser Arg Ser Glu Ile Ala Ser Arg Phe Arg Leu Gln Glu  
 130 135 140

Glu Asp Ile Ile Pro Asp Asp Lys Tyr Ile Ser Ala Ala Asn Lys Gly  
 145 150 155 160

Ser Leu Ser Cys Val Lys Glu His Thr Tyr Lys Val Glu Met Ser His

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Asn Gln Ala Leu Gly Lys Val Asn Val Leu Ser Pro Asn Arg Asn Val	180		185		190
His Glu Trp Leu Tyr Ser Phe Lys Pro Asn Phe Asn Gln Ile Glu Ser	195		200		205
Asn Asn Arg Thr Val Asn Ser Leu Ala Val Lys Ser Leu Leu Met Ala	210		215		220
Thr Glu Asn Asn Ile Met Pro Asn Ser Gln Ala Phe Val Lys Ala Ser	225		230		235
Thr Asp Ser His Phe Lys Leu Ser Leu Trp Leu Arg Ile Pro Lys Val	245		250		255
Leu Lys Gln Ile Ala Ile Gln Lys Leu Phe Lys Phe Ala Gly Asp Glu	260		265		270
Thr Gly Lys Ser Phe Tyr Leu Ser Ile Ala Cys Ile Pro Asn His Asn	275		280		285
Ser Val Glu Thr Ala Leu Asn Val Thr Val Ile Cys Arg His Gln Leu	290		295		300
Pro Ile Pro Lys Ser Lys Ala Pro Phe Glu Leu Ser Met Ile Phe Ser	305		310		315
Asp Leu Lys Glu Pro Tyr Asn Thr Val His Asp Pro Ser Tyr Pro Gln	325		330		335
Arg Ile Val His Ala Leu Leu Glu Thr His Thr Ser Phe Ala Gln Val	340		345		350
Leu Cys Asn Lys Leu Gln Glu Asp Val Ile Ile Tyr Thr Ile Asn Ser	355		360		365
Pro Glu Leu Thr Pro Ala Lys Leu Asp Leu Gly Glu Arg Thr Leu Asn	370		375		380
Tyr Ser Glu Asp Ala Ser Lys Lys Lys Tyr Phe Leu Ser Lys Thr Leu	385		390		395
Glu Cys Leu Pro Val Asn Val Gln Thr Met Ser Tyr Leu Asp Ser Ile	405		410		415
Gln Ile Pro Ser Trp Lys Ile Asp Phe Ala Arg Gly Glu Ile Arg Ile					



420                      425                      430  
 Ser Pro Gln Ser Thr Pro Ile Ala Arg Ser Leu Leu Lys Leu Asp Leu  
           435                      440                      445  
 Ser Lys Ile Lys Glu Lys Lys Ser Leu Thr Trp Glu Thr Ser Ser Tyr  
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Asp Leu Glu  
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<210> 13  
 <211> 258  
 <212> PRT  
 <213> Tomato Spotted Wilt Virus (Brazil isolate)

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                           20                      25                      30

Asn Phe Lys Thr Phe Cys Gln Glu Asn Leu Asp Leu Ile Lys Lys Met  
                           35                      40                      45

Ser Ile Thr Ser Cys Leu Thr Phe Leu Lys Asn Arg Gln Gly Ile Met  
           50                      55                      60

Lys Val Val Asn Gln Ser Asp Phe Thr Phe Gly Lys Val Thr Ile Lys  
           65                      70                      75                      80

Lys Asn Ser Glu Arg Val Gly Ala Lys Asp Met Thr Phe Arg Arg Leu  
                           85                      90                      95

Asp Ser Met Ile Arg Val Lys Leu Ile Glu Glu Thr Ala Asn Asn Glu  
                           100                      105                      110

Asn Leu Ala Ile Ile Lys Ala Lys Ile Ala Ser His Pro Leu Val Gln  
           115                      120                      125

Ala Tyr Gly Leu Pro Leu Ala Asp Ala Lys Ser Val Arg Leu Ala Ile  
           130                      135                      140

Met Leu Gly Gly Ser Ile Pro Leu Ile Ala Ser Val Asp Ser Phe Glu  
           145                      150                      155                      160

Met Ile Ser Val Val Leu Ala Ile Tyr Gln Asp Ala Lys Tyr Lys Glu  
165 170 175

Leu Gly Ile Glu Pro Thr Lys Tyr Asn Thr Lys Glu Ala Leu Gly Lys  
180 185 190

Val Cys Thr Val Leu Lys Ser Lys Gly Phe Thr Met Asp Asp Ala Gln  
195 200 205

Ile Asn Lys Gly Lys Glu Tyr Ala Lys Ile Leu Ser Ser Cys Asn Pro  
210 215 220

Asn Ala Lys Gly Ser Ile Ala Met Asp Tyr Tyr Ser Asp Asn Leu Asp  
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Val Ala

<210> 14

<211> 3049

<212> DNA

<213> Tomato Spotted Wilt Virus (Brazil isolate)

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aaaaaataca aaaaaataca aaaaaataaa aaaacccaaa aagatcccaa aagggacgat 1680
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aaaattgggtt tttgtttttg tttttttgtt ttttgttttt ttgtttttatt tttattttta 1860
gtttattttt tgttttttgtt attttttatt ttatttttatt ttctttttatt ttattttatat 1920
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aaggtgagaa agtgcaacac tgtagaccgc ggctggttact tatcctgtta atgtgatgat 3000
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<210> 15

<211> 777

<212> DNA

<213> Tomato Spotted Wilt Virus (Brazil isolate)

<400> 15

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aagtatcttg gcatattctt tccctttgtt tatctgtgca tcatccattg taaatccttt 180
gcttttaagc actgtgcaaa ccttccccag agcttccctta gtgttgtagt tagttggttc 240
aatccctaac tccttgtagt ttgcatcttg atatatggca agaacaacac tgatcatctc 300
gaagctgtca acagaagcaa tgagagggat actacctcca agcattatag caagtctcac 360
agattttgca tctgccagag gcagcccgta agcttggacc aaagggtggg aggcaatttt 420
tgctttgata atagcaagat tctcattgtt tgcagtctct tctatgagct tcaactcttat 480
catgctatca agcctcctga aagtcatatc cttagctcca actctttcag aatttttctt 540

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tatcgtgacc ttaccaaaaag taaaatcaact ttggttcaca actttcataa tgccttgggc 600  
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ctgacagaaa gtcttaaagt tgaatgcgac ctggttctgg tcttcttcaa actcaacatc 720  
tgcagattga gttaaaagag agacaatgtt ttcttttgtg agcttgacct tagacat 777

<210> 16  
<211> 18  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: primer

<400> 16  
gttctgagat ttgctagt 18

<210> 17  
<211> 18  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: primer

<400> 17  
ttatatcttc ttcttgga 18

<210> 18  
<211> 1401  
<212> DNA  
<213> Tomato spotted wilt virus

<400> 18  
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ctggttcaaa ctgagttgta ctctgattcg aggagcaaaa gtagcttcgg ctacacttca 180  
aaaattgggtg atattcctgc tgtagaggag gaaattttat ctgagaacgt tcatatccca 240  
gtgtttgatg atattgattt cagcatcaat atcaatgatt ctttcttggc aatttctgtt 300  
tgttccaaca cagttaacac caatggagtg aagcatcagg gtcactttaa agttctttct 360  
cttgcccaat tgcattccct tgaacctgtg atgagcaggt cagagattgc tagcagattc 420  
cggctccaag aagaagatat aattcctgat gacaaatata tatctgctgc taacaaggga 480  
tctctctcct gtgtcaaaga acatacttac aaagtcgaaa tgagccacaa tcaggcttta 540  
ggcaaagtga atgttcttct tctaacaga aatgttcatg agtggctgta tagtttcaaa 600  
ccaaatttca accagatcga aagtaataac agaactgtaa attctcttgc agtcaaactc 660  
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actgattctc attttaagtt gagccttttg ctgagaattc caaaagtttt gaagcaaata 780
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attgcatgca tcccaaata caacagtgtg gaaacagctt taaatgtcac tggtatatgt 900
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agatctttgc tcaagctgga tttgagcaag atcaaggaaa agaagtcctt gacttgggaa 1380
acatccagct atgatctaga a                                     1401

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<210> 19

<211> 777

<212> DNA

<213> Tomato spotted wilt virus

<400> 19

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aatcttgacc tgattaagaa aatgagtatc acttcatgtt tgactttctt gaagaatcgc 180
caaggcatta tgaaagtgtg gaaccaaagt gattttactt ttggtaaggc cacgataaag 240
aaaaattctg aaagagttag agctaaggat atgactttca ggaggcttga tagcatgata 300
agagtgaagc tcatagaaga gactgcaaac aatgagaatc ttgctattat caaagcaaaa 360
attgcctccc acccttttgt ccaagcttac gggctgcctc tggcagatgc aaaatctgtg 420
agacttgcta taatgcttgg aggtagtatc cctctcattg cttctgttga cagcttcgag 480
atgatcagtg ttgttcttgc catatatcaa gatgcaaagt acaaggagtt agggattgaa 540
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ggatttacia tggatgatgc acagataaac aaagggaaag aatatgcaa gatacttagt 660
tcttgcaatc ccaatgctaa gggaagcatt gctatggact attacagtga taatcttgac 720
aaattctatg aatgttttg agttaagaaa gaggccaaga ttgctggtgt tgcataa 777

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<210> 20

<211> 40

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 20

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40

<210> 21

<211> 42  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: primer  
  
 <400> 21  
 tacagtggat ccatgggttat ttcaaataat ttataaaagc ac 42  
  
  
 <210> 22  
 <211> 36  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: primer  
  
 <400> 22  
 agcattggat ccatgggtaa cacactaagc aagcac 36  
  
  
 <210> 23  
 <211> 46  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: primer  
  
 <400> 23  
 agctaatacta gaaccatgga tgactcacta aggaaagcat tgttgc 46  
  
  
 <210> 24  
 <211> 22  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: primer  
  
 <400> 24  
 cccactatcc ttcgcaagac cc 22  
  
 <210> 25

<211> 39  
<212> DNA  
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 25  
tacagtggat ccatgggtaa ggtaatccat aggcttgac

39

<210> 26  
<211> 40  
<212> DNA  
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 26  
agctaaccat ggtaagctc actaaggaaa gcattgttgc

40

<210> 27  
<211> 46  
<212> DNA  
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 27  
agctaacta gaaccatgga tgactcacta aggaaagcat tgttgc

46

<210> 28  
<211> 36  
<212> DNA  
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 28  
agcattggat ccatgggtaa cacactaagc aagcac

36

<210> 29

<211> 39  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: primer  
  
 <400> 29  
 tacagttcta gaaccatgga tgatgcaaag tctgtgagg 39  
  
  
 <210> 30  
 <211> 49  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: primer  
  
 <400> 30  
 agattctcta gaccatggtg acttgatgag caaagtctgt gaggttgc 49  
  
  
 <210> 31  
 <211> 42  
 <212> DNA  
 <213> Tomato spotted wilt virus  
  
 <400> 31  
 atggttaagc tcactaagga aagcattggt gctttgttga ca 42  
  
  
 <210> 32  
 <211> 41  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: 5' terminal  
 sequence of untranslatable, mutated nucleocapsid  
 DNA  
  
 <400> 32  
 atggatgact cactaaggaa agcattgttg ctttgttgac a 41  
  
  
 <210> 33  
 <211> 40



<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: 5' terminal  
sequence of untranslatable, mutated nucleocapsid  
DNA

<400> 33

atggatgact cactaaggaa agcattgttg ctttgtgaca

40

<210> 34

<211> 36

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: 5' terminal  
sequence of DNA encoding approximately the  
C-terminal half of the tomato spotted wilt virus  
nucleocapsid protein

<400> 34

atggatgatg caaagtctgt gaggcttgcc ataatg

36

<210> 35

<211> 42

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: 5' terminal  
sequence of untranslatable, mutated nucleocapsid  
DNA

<400> 35

atggtgactt gatgagcaaa gtctgtgagg cttgccataa tg

42